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November 2, 1998

AEROSPACE MEDICINE AND BIOLOGY

A CONTINUING BIBLIOGRAPHY WITH INDEXES



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55	Space Biology Includes exobiology; planetary biology; and extraterrestrial life.	N.A.

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Typical Report Citation and Abstract

- ❶ 19970001126 NASA Langley Research Center, Hampton, VA USA
- ❷ **Water Tunnel Flow Visualization Study Through Poststall of 12 Novel Planform Shapes**
- ❸ Gatlin, Gregory M., NASA Langley Research Center, USA Neuhart, Dan H., Lockheed Engineering and Sciences Co., USA;
- ❹ Mar. 1996; 130p; In English
- ❺ Contract(s)/Grant(s): RTOP 505-68-70-04
- ❻ Report No(s): NASA-TM-4663; NAS 1.15:4663; L-17418; No Copyright; Avail: CASI; A07, Hardcopy; A02, Microfiche
- ❼ To determine the flow field characteristics of 12 planform geometries, a flow visualization investigation was conducted in the Langley 16- by 24-Inch Water Tunnel. Concepts studied included flat plate representations of diamond wings, twin bodies, double wings, cutout wing configurations, and serrated forebodies. The off-surface flow patterns were identified by injecting colored dyes from the model surface into the free-stream flow. These dyes generally were injected so that the localized vortical flow patterns were visualized. Photographs were obtained for angles of attack ranging from 10° to 50°, and all investigations were conducted at a test section speed of 0.25 ft per sec. Results from the investigation indicate that the formation of strong vortices on highly swept forebodies can improve poststall lift characteristics; however, the asymmetric bursting of these vortices could produce substantial control problems. A wing cutout was found to significantly alter the position of the forebody vortex on the wing by shifting the vortex inboard. Serrated forebodies were found to effectively generate multiple vortices over the configuration. Vortices from 65° swept forebody serrations tended to roll together, while vortices from 40° swept serrations were more effective in generating additional lift caused by their more independent nature.
- ❽ Author
- ❾ *Water Tunnel Tests; Flow Visualization; Flow Distribution; Free Flow; Planforms; Wing Profiles; Aerodynamic Configurations*

Key

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AEROSPACE MEDICINE AND BIOLOGY

A Continuing Bibliography (Suppl. 477)

NOVEMBER 2, 1998

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LIFE SCIENCES (GENERAL)

19980220228 Iowa Univ., Dept. of Psychology, Iowa City, IA USA

Fos Expression in Rat Brain During Depletion-Induced Thirst and Salt Appetite

Thunhorst, R. L., Iowa Univ., USA; Xu, Z., Iowa Univ., USA; Cicha, M. Z., Iowa Univ., USA; Zardetto-Smith, A. M., Iowa Univ., USA; Johnson, A. K., Iowa Univ., USA; American Journal of Physiology; 1998; ISSN 0363-6119; Volume 74, pp. R1807-1814; In English

Contract(s)/Grant(s): N00014-97-1-0145; NAG5-6171; NIH-MH-50260; NIH-HL-57492; NIH-HL-57472; Copyright; Avail: Issuing Activity, Hardcopy, Microfiche

The expression of Fos protein (Fos immunoreactivity, Fos-ir) was mapped in the brain of rats subjected to an angiotensin-dependent model of thirst and salt appetite. The physiological state associated with water and sodium ingestion was produced by the concurrent subcutaneous administration of the diuretic furosemide (10 mg/kg) and a low dose of the angiotensin-converting enzyme (ACE) inhibitor captopril (5 mg/kg; Furo/Cap treatment). The animals were killed 2 h posttreatment, and the brains were processed for Fos-ir to assess neural activation. Furo/Cap treatment significantly increased Fos-ir density above baseline levels both in structures of the lamina terminalis and hypothalamus known to mediate the actions of ANG 2 and in hindbrain regions associated with blood volume and pressure regulation. Furo/Cap treatment also typically increased Fos-ir density in these structures above levels observed after administration of furosemide or captopril separately. Fos-ir was reduced to a greater extent in forebrain than in hindbrain areas by a dose of captopril (100 mg/kg sc) known to block the actions of ACE in the brain. The present work provides further evidence that areas of lamina terminalis subserve angiotensin-dependent thirst and salt appetite.

Derived from text

Brain; Rats; Water; Sodium

19980220435 Maine Univ., Darling Marine Center, Walpole, ME USA

Ecophysiological Characteristics of Obligate Methanotrophic Bacteria and Methane Oxidation In Situ

King, Gary M., Maine Univ., USA; Microbial Growth on C(1) Compounds; 1993, pp. 303-313; In English

Contract(s)/Grant(s): NAGw-3746; NAGw-1428; NSF BSR 91-07315; Copyright; Avail: Issuing Activity, Hardcopy, Microfiche

Most of the obligate methane-oxidizing bacteria (MOB) described to date are neutrophilic mesophiles that grow optimally in dilute media. Kinetic analyses generally indicate that bacterial methane uptake occurs by transport systems with a K_{m} greater than 1 micronM. These and other properties of MOB are inconsistent with characteristics of methane oxidation in situ. The inconsistencies indicate a need for greater attention to the ecophysiological characteristics of isolates and the design of enrichment and isolation schemes which emphasize ecologically relevant parameters (e.g., low temperature, limited and diverse substrate availability, low water potential).

Author

Ecology; Physiological Effects; Bacteria; Oxidation; Methane

19980221242 Public Health Service, National Toxicology Program, Research Triangle Park, NC USA

Toxicology and Carcinogenesis Studies of Tetrahydrofuran (CAS No. 109-99-9) in F344/N Rats and B6C3F1 Mice (Inhalation Studies)

Jun. 1998; 252p; In English

Report No.(s): PB98-164544; NTP-TR-475; NIH/PUB-98-3965; No Copyright; Avail: CASI; A12, Hardcopy; A03, Microfiche

Tetrahydrofuran is used as a reaction medium for Grignard and metal hydride reactions; in the synthesis of butyrolactone, succinic acid, and 1,4-butanediol diacetate; in the fabrication of articles for packaging, transporting, and storing of foods; as a

solvent for dyes and lacquers; and as a chemical intermediate in polymerization solvent for fat oils, unvulcanized rubber, resins, and plastics. Tetrahydrofuran is also an indirect food additive when it is in the contact surface of articles intended for use in food processing. Tetrahydrofuran was nominated for study because of the potential for occupational exposure in humans. Male and female F344/N rats and B6C3F(sub 1) mice were exposed to tetrahydrofuran (approximately 99% pure) by inhalation for 14 weeks or 2 years. Genetic toxicology studies were conducted in *Salmonella typhimurium*, cultured Chinese hamster ovary cells, *Drosophila melanogaster*, mouse bone marrow cells, and mouse peripheral blood erythrocytes.

NTIS

Toxicology; Carcinogens; Cells (Biology); Mice; Rats; Tetrahydrofuran

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AEROSPACE MEDICINE

Includes physiological factors; biological effects of radiation; and effects of weightlessness on man and animals.

19980219171 Civil Aeromedical Inst., Oklahoma City, OK USA

DNA Profiling as an Adjunct Quality Control/Quality Assurance in Forensic Toxicology Final Report

Chaturvedi, Arvind K., Civil Aeromedical Inst., USA; Vu, Nicole T., Civil Aeromedical Inst., USA; Ritter, Roxane M., Civil Aeromedical Inst., USA; Canfield, Dennis V., Civil Aeromedical Inst., USA; Jul. 1998; 10p; In English

Contract(s)/Grant(s): FAA-AM-B-97-TOX-202

Report No.(s): DOT/FAA/AM-98/18; No Copyright; Avail: CASI; A02, Hardcopy; A01, Microfiche

To investigate aircraft accidents, multiple postmortem biological samples of victims are submitted to the Civil Aeromedical Institute for toxicological evaluation. However, depending upon the nature of a particular accident, body components are often scattered, disintegrated, commingled, contaminated, and/or putrefied. These factors impose difficulties on victim identification, tissue matching, and thereby authentic sample analysis and result interpretation. Nevertheless, these Quality Control/Quality Assurance (QC/QA) related limitations can be overpowered by DNA profiling. In this regard, three situations are hereby exemplified where DNA analysis was instrumental in resolving a tissue mismatching/commingling issue, pinpointing an accessioning/analytical error, and interpreting an unusual analytical result. Biological samples from these cases were examined for six independently inherited genetic loci using Polymerase Chain Reaction (PCR) suitable for analyzing degraded DNA generally encountered in putrefied/contaminated samples. In the first situation, three of five specimen bags from one accident were labeled with two different names. DNA analysis revealed that one of these bags actually had commingled specimens, originating from two different individuals. Therefore, the sample was excluded from the final toxicological evaluation. In the second situation, an unacceptable blind control result was reported in a cyanide batch analysis. By comparing DNA profiles of the batch samples with those of the known positive and negative blind controls, it was concluded that the error had occurred during the analysis instead of accessioning. Accordingly, preventive measures were taken at the analytical level. The third situation was related to the presence of atropine at toxic concentrations in the blood (318 ng/ml) and lung (727 ng/g) with its absence in the liver, spleen, and brain—a pattern inconsistent with the general poisoning of drugs. DNA analysis of the blood and liver samples exhibited their common identity, ensuring that the submitted samples had indeed originated from one individual. The selective presence of atropine was attributed to its possible administration into the thoracic cavity by the emergency medical personnel at the accident site for resuscitation, but circulatory failure prevented its further distribution. These examples clearly demonstrate the applicability of the PCR-based DNA profiling in a QC/QA program to enhance the effectiveness of forensic toxicology operation. However, such applicability will be feasible only in those setups where in-house DNA facilities are accessible.

Author

Deoxyribonucleic Acid; Toxicology; Aircraft Accidents; Identities; Cyanides

19980219351 NASA Langley Research Center, Hampton, VA USA

Aerospace Medicine and Biology: A Continuing Bibliography, Supplement 474

Sep. 21, 1998; 27p; In English

Report No.(s): NASA/SP-1998-7011/SUPPL474; NAS 1.21:7011/SUPPL474; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This bibliography lists reports, articles and other documents recently introduced into the NASA scientific and technical information database. Subject coverage includes: Aerospace medicine and psychology, life support systems and controlled environments, safety equipment, exobiology and extraterrestrial life and flightcrew behavior and performance.

CASI

Bibliographies; Aerospace Medicine; Bioastronautics; Biological Effects; Exobiology; Indexes (Documentation)

19980220175 NASA Langley Research Center, Hampton, VA USA

Aerospace Medicine and Biology: A Continuing Bibliography, Supplement 475

Oct. 05, 1998; 27p; In English

Report No.(s): NASA/SP-1998-7011/SUPPL475; NAS 1.21:7011/SUPPL475; No Copyright; Avail: CASI; A03, Hardcopy; A01, Microfiche

This supplemental issue of *Aerospace Medicine and Biology, A Continuing Bibliography with Indexes* lists reports, articles, and other documents recently announced in the NASA STI Database. In its subject coverage, *Aerospace Medicine and Biology* concentrates on the biological, physiological, psychological, and environmental effects to which humans are subjected during and following simulated or actual flight in the Earth's atmosphere or in interplanetary space. References describing similar effects on biological organisms of lower order are also included. Such related topics as sanitary problems, pharmacology, toxicology, safety and survival, life support systems, exobiology, and personnel factors receive appropriate attention. Applied research receives the most emphasis, but references to fundamental studies and theoretical principles related to experimental development also qualify for inclusion.

CASI

Aerospace Medicine; Bibliographies; Exobiology; Indexes (Documentation); Biological Effects

19980220226 Iowa Univ., Dept. of Psychology, Iowa City, IA USA

Salt Appetite: Interaction of Forebrain Angiotensinergic and Hindbrain Serotonergic Mechanisms

Menani, Jose Vanderlei, Paulista State Univ., Brazil; Colombari, Debora S. A., Iowa Univ., USA; Beltz, Terry G., Iowa Univ., USA; Thunhorst, Robert L., Iowa Univ., USA; Johnson, Alan Kim, Iowa Univ., USA; *Brain Research*; 1998; ISSN 0006-8993, pp. 1-7; In English

Contract(s)/Grant(s): N00014-97-1-0145; FAPESP-93/0167-7; NAG5-6171; NIH-HL-14388; NIH-HL-57472; NIH-HL-54292; Copyright; Avail: Issuing Activity, Hardcopy, Microfiche

Methysergide injected into the lateral parabrachial nucleus (LPBN) increases the salt appetite of rats depleted of sodium by furosemide (FURO). The present study investigated the effects of angiotensin 2 (ANG 2) receptor blockade in the subfornical organ (SFO) on this increased salt appetite. The intake of 0.3 M NaCl and water was induced by combined administration of the diuretic, FURO, and the angiotensin-converting enzyme inhibitor, captopril (CAP). Pretreatment of the SFO with the angiotensin Type 1 (AT₁) receptor antagonist, losartan (1 microgram/200 nl), reduced water intake but not 0.3 M NaCl intake induced by subcutaneous FURO + CAP. Methysergide (4 microgram/200 nl) injected bilaterally into the LPBN increased 0.3 M NaCl intake after FURO + CAP. Losartan injected into the SFO prevented additional 0.3 M NaCl intake caused by methysergide injections into the LPBN. These results indicate that AT₁ receptors located in the SFO may have a role in mediating the intake of sodium and water induced by sodium depletion. They also suggest that after treatment with FURO + CAP an LPBN-associated serotonergic mechanism inhibits increased sodium intake.

Author

Sodium; Pretreatment; Rats; Enzymes

19980220229 Iowa Univ., Dept. of Psychology, Iowa City, IA USA

The Neuroendocrinology of Thirst and Salt Appetite: Visceral Sensory Signals and Mechanisms of Central Integration

Johnson, Alan Kim, Iowa Univ., USA; Thunhorst, Robert L., Iowa Univ., USA; *Frontiers in Neuroendocrinology*; 1997; ISSN 0091-3022; Volume 18, pp. 292-353; In English

Contract(s)/Grant(s): N00014-97-1-0145; NAG5-6171; NAGw-4358; NIH-HL-14388; NIH-HL-57472; NIH-HL-54292

Report No.(s): Rept-FN970153; Copyright; Avail: Issuing Activity, Hardcopy, Microfiche

This review examines recent advances in the study of the behavioral responses to deficits of body water and body sodium that in humans are accompanied by the sensations of thirst and salt appetite. Thirst and salt appetite are satisfied by ingesting water and salty substances. These behavioral responses to losses of body fluids, together with reflex endocrine and neural responses, are critical for reestablishing homeostasis. Like their endocrine and neural counterparts, these behaviors are under the control of both excitatory and inhibitory influences arising from changes in osmolality, endocrine factors such as angiotensin and aldosterone, and neural signals from low and high pressure baroreceptors. The excitatory and inhibitory influences reaching the brain require the integrative capacity of a neural network which includes the structures of the lamina terminalis, the amygdala, the perifornical area, and the paraventricular nucleus in the forebrain, and the lateral parabrachial nucleus (LPBN), the nucleus tractus solitarius (NTS), and the area postrema in the hindbrain. These regions are discussed in terms of their roles in receiving afferent sensory input and in processing information related to hydromineral balance. Osmoreceptors controlling thirst are located in systemic viscera and in central structures that lack the blood-brain barrier. Angiotensin and aldosterone act on and through structures of the lamina terminalis and the amygdala to stimulate thirst and sodium appetite under conditions of hypovolemia. The NTS and

LPBN receive neural signals from baroreceptors and are responsible for inhibiting the ingestion of fluids under conditions of increased volume and pressure and for stimulating thirst under conditions of hypovolemia and hypotension. The interplay of multiple facilitory influences within the brain may take the form of interactions between descending angiotensinergic systems originating in the forebrain and ascending adrenergic systems emanating from the hindbrain. Oxytocin and serotonin are additional candidate neuro-chemicals with postulated inhibitory central actions and with essential roles in the overall integration of sensory input within the neural network devoted to maintaining hydromineral balance.

Author

Adrenal Gland; Body Fluids; Sodium; Sympathetic Nervous System; Vasoconstrictor Drugs; Blood-Brain Barrier; Brain

19980221025 Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Washington, DC USA
Health Effects Test Guidelines. OPPTS Series 870.1000 Acute Toxicity Testing: Background

Aug. 1998; 598p; In English

Report No.(s): PB98-101967; EPA/712/C-98/189; No Copyright; Avail: CASI; A25, Hardcopy; A06, Microfiche

The Agency considers the evaluation of toxicity following short term exposure to a chemical to be an integral step in the assessment of its toxic potential under the regulatory framework of its pesticide and toxic substances programs. In the assessment and evaluation of the toxic characteristics of a substance, acute toxicity is generally performed by the probable route of exposure in order to provide information on health hazards likely to arise from short-term exposure by that route. For pesticides, the short-term toxicity testing battery consists of acute toxicity tests by the oral, dermal, and inhalation routes; skin and eye irritation testing; and testing for dermal sensitization. Data from an acute study may serve as a basis for hazard categorization, labeling, or child-resistant packaging and may also serve to designate pesticides which may be applied only by certified applicators. It is also an initial step in establishing a dosage regimen in subchronic and other studies and may provide information on absorption and the mode of toxic action of a substance.

NTIS

Health; Toxicity; Pesticides

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MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing. For related information see also 16 Space Transportation.

19980220263 Ibaraki Univ., Faculty of Engineering, Hitachi, Japan

Man-Machine Interface for NC Lathe Using a Personal Computer

Maekawa, Katsuhiro, Ibaraki Univ., Japan; Ohshima, Ikuya, Ibaraki Univ., Japan; Noguchi, Kazuhide, Niigata Univ., Japan; Journal of the Faculty of Engineering, Ibaraki University; Dec. 1992; ISSN 0367-7389; Volume 40, pp. 117-129; In Japanese; No Copyright; Avail: Issuing Activity, Hardcopy, Microfiche

With reference to the results of a questionnaire which was set out on man-machine interfaces to medium and small sized machining workshops, a prototype of interactive generation systems for NC parts program has been developed in order to make full use of a NC lathe in conjunction with a 16 bit personal computer on which the software runs. The programming system can be regarded as a user friendly man-machine interface since inexperienced workers easily generate tool paths which are visualized on the monitor screen. The authors focus the applications and propagation of the system on medium and small-sized factories as it includes the following features: (1) small size and low investment, and (2) easy and user friendly operation. A couple of examples of the operation sequences have been demonstrated, showing that this system can be extended to a fully automated NC parts programming system.

Author

Man Machine Systems; Personal Computers; Lathes; Numerical Control; Machining; Computer Aided Manufacturing

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